Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) An encoding method of an RS (Reed-Solomon) code in bit level comprising:

generating, via a computer code or electronic circuit, a binary equivalence matrix of the RS code by multiplying a non-binary systematic generator matrix and a binary information sequence of the RS code such that the generated binary equivalence matrix includes row and columns which are m times rows and columns of the non-binary matrix, where symbols of the non-binary matrix have a $GF(2^m)$ dimension; and

generating, via the computer code or electronic circuit, row and column vectors using the binary equivalence matrix of the RS code as a component code.

2. (Currently Amended) A decoding method of an RS (Reed-Solomon) code in bit level comprising:

generating, via a computer code or electronic circuit, a binary trellis using a binary parity check matrix corresponding to a binary generator matrix of the RS code from a received signal; and

performing, via the computer code or electronic circuit, repeatedly processes of decoding row and column vectors using the binary trellis and of getting extrinsic

information of bit level and inputting the extrinsic information of bit level as a new decoding information,

wherein the binary generator matrix of the RS code is converted from a non-binary matrix originally representing the RS code and includes rows and columns which are m times rows and columns of the non-binary matrix, where symbols of the non-binary matrix have a $GF(2^m)$ dimension.

3. (Previously Presented) An encoding apparatus of an RS (Reed-Solomon) code in bit level comprising:

a source information inputting unit configured to receive source information for encoding;

a binary conversion unit configured to convert non-binary symbols outputted from the source information inputting unit into binary symbols;

an encoding unit configured to encode the binary symbols to check and correct errors which may be generated by the binary symbols on a communication channel; and

a modulating unit configured to modulate the binary symbols encoded in the encoding unit so as to transmit the symbols through the communication channel,

wherein the binary conversion unit generates a binary equivalence of the RS code by multiplying a binary information sequence and a non-binary systematic generator matrix such that the generated binary equivalence matrix includes row and columns which

are m times rows and columns of the non-binary matrix, where symbols of the non-binary matrix have a GF(2^m) dimension, and then generates a bit level RS code using the binary equivalence matrix.

4. (Canceled).

5. (Original) The apparatus of claim 3, wherein the encoding unit generates row and column vectors using the bit level RS code as a component code.

6. (Previously Presented) A decoding apparatus of an RS (Reed-Solomon) code in bit level comprising:

a demodulating unit configured to demodulate binary symbols of the RS code transmitted from a communication channel;

a decoding unit configured to repeatedly decode row and column vectors of the binary symbols using a binary equivalence matrix of the RS code; and

a source information outputting unit configured to output the decoded binary symbols as a data stream,

wherein the binary equivalence matrix of the RS code is converted from a non-binary matrix originally representing the RS code and includes rows and columns which are m times rows and columns of the non-binary matrix, where symbols of the non-binary matrix have a GF(2^m) dimension.

7. (Previously Presented) The apparatus of claim 6, wherein the decoding unit comprises:

a column vector decoder configured to generate a column vector by calculating the sequence of the bit level RS code and new decoding information transmitted from the demodulating unit; and

a row vector decoder configured to generate a row vector by being inputted the column vector transmitted from the column vector decoder, and to feedback new decoding information to the column vector decoder.

8. (Previously Presented) A ~~method of processing a Reed-Solomon (RS) code~~ computer program product configured to execute computer programming instructions, comprising:

~~transforming~~ a first computer code configured to transform a non-binary matrix representation of ~~the RS~~ a Reed-Solomon (RS) code including non-binary symbols into a binary equivalence matrix including only binary symbols; and

~~generating~~ a second computer code configured to generate row and column vectors using the binary equivalence matrix,

wherein each non-binary symbol is transformed into an m x m matrix, where symbols of the non-binary matrix have GF(2^m) dimension, and

wherein the binary equivalence matrix includes row and columns which are m times row and columns of the non-binary matrix.

9. (Canceled).

10. (Canceled).

11. (Currently Amended) The ~~method~~ computer program product of claim 8, further comprising:

~~encoding~~ a third computer code configured to encode the binary symbols to check and correct errors which may be generated by the binary symbols on a communication channel; and

~~modulating~~ a fourth computer code configured to modulate the encoded binary symbols so as to transmit the symbols through the communication channel.

12. (Currently Amended) The ~~method~~ computer program product of claim 11, further comprising:

~~demodulating~~ a fifth computer code configured to demodulate the binary symbols of the RS code transmitted from the communication channel;

a sixth computer code configured to repeatedly ~~decoding~~ decode row and column vectors of the binary symbols using the binary equivalence matrix of the RS code; and

~~outputting~~ a seventh computer code configured to output the decoded binary symbols as a data stream.

13. (Currently Amended) An apparatus for processing a Reed-Solomon (RS) code, comprising:

a converting unit configured to transform a non-binary matrix representation of the RS code including non-binary symbols into a binary equivalence matrix including only binary symbols; and

an encoding unit configured to encode row and column vectors using the binary equivalence matrix,

wherein the converting unit transforms each non-binary symbol into an m x m matrix, where symbols of the non-binary matrix have a $GF(2^m)$ dimension, and

wherein the binary equivalence matrix includes row and columns which are m times row and columns of the non-binary matrix.

14. (Canceled).

15. (Canceled).

16. (Previously Presented) The apparatus of claim 13, further comprising:

the encoding unit configured to encode the binary symbols to check and correct errors which may be generated by the binary symbols on a communication channel; and

a modulating unit configured to modulate the encoded binary symbols so as to transmit the symbols through the communication channel.

17. (Previously Presented) The apparatus of claim 16, further comprising:

a demodulating unit configured to demodulate binary symbols of the RS code transmitted from the communication channel;

a decoding unit configured to repeatedly decode row and column vectors of the binary symbols using the binary equivalence matrix of the RS code; and

an outputting unit configured to output the decoded binary symbols as a data stream.